What is claimed is:

1. A method of adaptive pixel correction of a multi-color matrix from a sensor comprising:

collecting pixel values of a two-dimensional multi-pixel kernel around a particular pixel from the multi-color matrix;

generating plural vectors from the kernel, each vector having the particular pixel as a central element;

normalizing values for nearest neighbor elements to the central element for each vector; and

determining an estimated value for the particular pixel based on the normalized values.

2. The method of claim 1, wherein the determining includes:

assessing an edge direction at the particular pixel from the normalized values; and

interpolating the estimated value for the particular pixel based on the normalized value for the edge direction.

3. The method of claim 1, wherein the generating includes disregarding a vertical vector when the corresponding column has been marked as having a column defect.

4. The method of claim 1, further comprising interpolating a value of a vector element corresponding to a defective pixel in the kernel other than the particular pixel.

5. The method of claim 4, wherein the interpolating the value of the vector element includes:

determining whether the defective pixel exists within the kernel; and

locally interpolating the value for the vector element in a defective vector such that a step function along one half of the defective vector does not average into an opposite half of the defective vector when the defective pixel exists.

6. The method of claim 1, wherein the plural vectors includes four vectors.

7. The method of claim 1, wherein the multi-color matrix is a Bayer matrix.

8. The method of claim 1, wherein the kernel occupies a square that is symmetrically centered around the particular pixel.

9. The method of claim 8, wherein the kernel includes 7 by 7 pixels.

10. The method of claim 1, wherein the normalizing includes:

assessing an intended color of the particular pixel;

finding first and second single-sided single-color gradients for each vector, each gradient being a difference of values from a non-defect color plane along a corresponding vector; and

combining the single-sided single-color gradient with a value of a corresponding pixel of the intended color of the corresponding vector to define a new value for a nearest neighbor pixel to the particular pixel.

11. The method of claim 1, wherein the determining the estimated value includes:

assessing an edge direction at the particular pixel from the normalized values by determining an edge biased weight quantity according to

$$\mathbf{X_i = \{ 1 - \delta_i^k / (\Sigma_i \delta_i^k)\} / (I - 1),}$$

for each vector **i** wherein $\delta_i = \mathbf{abs\ val\ \{ d_i [-1] - d_i [+1]\}}$ and selecting the largest absolute value of $\mathbf{X_i}$; and

interpolating the estimated value for the particular pixel based on the normalized values for nearest neighbor elements and the edge direction and re-estimating a value for the particular pixel based on the selected edge biased weight quantity.

12. The method of claim 1, further including repeating the method so that the kernel traverses the matrix column by column whilst at the end of each column stepping by one row.

13. The method of claim 1, further including replacing the estimated value of the particular pixel with a sampled value of the particular pixel when the absolute value of a difference between the estimated value and the sampled value is greater than ϵC, wherein ϵ is a defined maximum defect deviation and C is an available dynamic range.

14. The method of claim 13, wherein the defined maximum defect deviation ϵ is determined over a training set of pixels to be

$$\epsilon = \text{abs val } \{ a_{max} - a' \} / C.$$

wherein a_{max} is the maximum possible deviation that the defective pixel is capable of and a' is a true value for the pixel in the training set.

15. The method of claim 1, further including replacing the estimated value of the particular pixel with a sampled value of the particular pixel when the absolute value of a difference between the estimated value and the sampled value is greater than $\epsilon C + tC$, wherein ϵ is a defined maximum defect deviation, t is a tolerance value dependent on a local Nyquist frequency and C is an available dynamic range.

16. The method of claim 15, wherein the defined maximum defect deviation ϵ is determined over a training set of pixels to be

$$\epsilon = \text{abs val } \{ a_{max} - a' \} / C.$$

wherein $\mathbf{a}_{max}$ is the maximum possible deviation that the defective pixel is capable of and $\mathbf{a'}$ is a true value for the pixel in the training set.

17. The method of claim 1, wherein upon non-finding of an edge, a defectiveness of the particular pixel is interpolated without being restricting to a selected edge biased weight quantity.

18. A system for adaptive pixel correction of a multi-color matrix from a sensor comprising:

a processor;

a first module to control the processor to collect pixel values of a two-dimensional multi-pixel kernel around a particular pixel from the multi-color matrix;

a second module to control the processor to generate plural vectors from the kernel, each vector having the particular pixel as a central element;

a third module to control the processor to normalizing values for nearest neighbor elements to the central element for each vector; and

a fourth module to control the processor to determine an estimated value based on the normalized values.

19. The system of claim 18, wherein the fourth module includes:

logic to assess an edge direction at the particular pixel from the normalized values; and

logic to interpolate an estimated value for the particular pixel based on the normalized value for the edge direction.

20. The system of claim 18, wherein the second module includes logic to disregard a vertical vector when the corresponding column has been marked as having a column defect.

21. The system of claim 18, further comprising a fifth module to interpolate a value of a vector element corresponding to a defective pixel in the kernel other than the particular pixel.

22. The system of claim 21, wherein the fifth module includes:

logic to determine whether the defective pixel exists within the kernel; and

logic to locally interpolate the value for the vector element in a defective vector such that a step function along one half of the defective vector does not average into an opposite half of the defective vector when the defective pixel exists.

23. The system of claim 18, wherein the third module includes:

logic to assess an intended color of the particular pixel;

logic to find first and second single-sided single-color gradients for each vector, each gradient being a difference of values from a non-defect color plane along a corresponding vector; and

logic to combine the single-sided single-color gradient with a value of a corresponding pixel of the intended color of the corresponding vector to define a new value for a nearest neighbor pixel to the particular pixel.

24. The system of claim 18, wherein the fourth module includes:

logic to assess an edge direction at the particular pixel from the normalized values by determining an edge biased weight quantity according to

$$\mathbf{X_i = \{ 1 - \delta_i^{k} / (\Sigma_i \, \delta_i^{k})\} / (I - 1),}$$

for each vector **i** wherein δ_i = **abs val { $\mathbf{d_i}$ [-1] - $\mathbf{d_i}$ [+1]}** and selecting the largest absolute value of $\mathbf{X_i}$; and

logic to interpolate the estimated value for the particular pixel based on the normalized values for nearest neighbor elements and the edge direction and re-estimating a value for the particular pixel based on the selected edge biased weight quantity.

25. A computer readable medium to control a processor for adaptive pixel correction of a multi-color matrix from a sensor, the medium comprising:

a first module to control the processor to collect pixel values of a two-dimensional multi-pixel kernel around a particular pixel from the multi-color matrix;

a second module to control the processor to generate plural vectors from the kernel, each vector having the particular pixel as a central element;

a third module to control the processor to normalizing values for nearest neighbor elements to the central element for each vector; and

a fourth module to control the processor to determine an estimated value based on the normalized values.

26. The medium of claim 25, wherein the fourth module includes:

logic to assess an edge direction at the particular pixel from the normalized values; and

logic to interpolate an estimated value for the particular pixel based on the normalized value for the edge direction.

27. The medium of claim 25, wherein the second module includes logic to disregard a vertical vector when the corresponding column has been marked as having a column defect.

28. The medium of claim 25, further comprising a fifth module to interpolate a value of a vector element corresponding to a defective pixel in the kernel other than the particular pixel.

29. The medium of claim 28, wherein the fifth module includes:

logic to determine whether the defective pixel exists within the kernel; and

logic to locally interpolate the value for the vector element in a defective vector such that a step function along one half of the defective vector does not average into an opposite half of the defective vector when the defective pixel exists.

30. The medium of claim 25, wherein the third module includes:

logic to assess an intended color of the particular pixel;

logic to find first and second single-sided single-color gradients for each vector, each gradient being a difference of values from a non-defect color plane along a corresponding vector; and

logic to combine the single-sided single-color gradient with a value of a corresponding pixel of the intended color of the corresponding vector to define a new value for a nearest neighbor pixel to the particular pixel.

31. The medium of claim 25, wherein the fourth module includes:

logic to assess an edge direction at the particular pixel from the normalized values by determining an edge biased weight quantity according to

$$X_i = \{ 1 - \delta_i^k / (\Sigma_i \delta_i^k)\} / (I - 1),$$

for each vector **i** wherein δ_i = **abs val** $\{ d_i [-1] - d_i [+1]\}$ and selecting the largest absolute value of X_i; and

logic to interpolate the estimated value for the particular pixel based on the normalized values for nearest neighbor elements and the edge direction and re-estimating a value for the particular pixel based on the selected edge biased weight quantity.